

EXECUTIVE SUMMARY

General Information

The Methow River Water Resource Inventory Area (WRIA) 48 is located in north central Washington State. A tributary of the Columbia River, it is bordered on the west by the Cascade mountains, on the north by Canada, on the east by Buckhorn Mountains and the Okanogan River drainage, and on the south by the Columbia River and the Sawtooth Ridge. Draining nearly 1,890 square miles (1,208,746 acres), the Methow River flows southward for more than 80 miles through western Okanogan County before emptying into the Columbia River near the town of Pateros.

Upper Columbia River summer steelhead, including the Methow River run, were listed under the Endangered Species Act (ESA) as “endangered” on August 18, 1997. Upper Columbia River spring-run chinook salmon, including the Methow River run, were listed under the ESA as “endangered” on March 24, 1999. Bull trout in the Methow River were listed under the ESA as “threatened” on June 10, 1998. All of these ESA listed species inhabit the Methow watershed and have experienced a severe decline in adult numbers. Although not an ESA listed species, summer-run chinook which spawn and rear in the Methow River, declined dramatically between 1967 and 1991 (WDFW 1993). Based on a short-term severe decline and a long-term negative trend in escapement summer-run chinook are identified as “depressed” by the Washington Department of Fish and Wildlife (WDFW 1993) in the Salmon and Steelhead Stock Inventory report (SASSI).

In the late 1800’s, overfishing on the lower Columbia River severely depleted salmon runs to upper Columbia River tributaries (Chapman 1986). Later, a hydroelectric dam across the Methow River at Pateros blocked all fish passage between 1915 and 1929. By the time the dam was removed, the Methow River run of coho was extinct, spring and summer chinook runs, as well as steelhead were severely depressed. In 1939, a massive hatchery program was launched to offset the loss of access and mitigate for impacts created by the soon to be completed Grand Coulee Dam. Despite ongoing hatchery programs, resource managers have not been able to reestablish the salmon and steelhead populations to self-sustaining levels. Failure can be attributed to a number of factors including, passage problems and mortality associated with nine hydroelectric facilities on the mainstem Columbia River, unfavorable ocean conditions, harvest pressures, and degradation of ecological processes and habitat within the Methow watershed (WDFW et al. 1990; Peven, 1992; Caldwell and Catterson 1992; WDFW 1993; Williams et al. 1996).

The Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Methow Watershed focuses on habitat conditions in the Methow watershed as they affect the ability of the habitat to sustain naturally-producing salmonid populations. It provides a snapshot in time based on the data and published material available during the development of this report and the professional knowledge of the Technical Advisory Group (TAG). Although revisions to the report are not currently funded, the Washington

State Conservation Commission (WCC) will be requesting funding in the 2001 - 2003 budget for a continuation in funding to allow for this need.

Data in the literature on habitat conditions in the watershed are extremely limited regarding private lands. The quality of available information for public lands, which comprise about 94% of the watershed (Rock Island Hydroelectric Facility et al. 1998), is highly variable. Conclusions within the literature often lack adequate supporting data and in some cases are contradictory. Data collection and studies in the Methow watershed generally focus only on subwatersheds or portions of subwatersheds thereby not supporting a watershed-level, ecosystem-based approach to salmonid management. Thus, the TAG relied heavily on its combined professional knowledge to assess the extent to which habitat conditions are affecting salmonid productivity in the Methow watershed and their relative importance in limiting the productivity of naturally-producing salmonid populations watershed-wide. Knowledge of habitat-forming processes and general salmonid habitat needs provide the basis for drawing conclusions in this report.

In the short-term, structural manipulations of the stream channel (ie. barbs, LWD placements, rock/log toes, weirs, bioengineered bank stabilization) designed to treat symptoms of habitat degradation should be implemented with caution until a long-term salmonid habitat protection and restoration strategy can be developed. A long-term strategy should maintain a watershed-wide, ecosystem-based approach and define a course of action to correct those factors that are causing the habitat degradation. Section 070 of the Salmon Recovery Act (RCW 75.46, also known as HB2496), directs the Lead Entity Citizen's Committee to develop this strategy. As per this legislation, the Colville Confederated Tribes and Okanogan County, co-Lead Entities for Okanogan County, have convened this Citizen's Committee. Components of the strategy for "prioritizing and implementing salmon restoration activities... in a logical sequential manner that produces habitat capable of sustaining healthy populations of salmon" are to include project monitoring, project evaluation, and adaptive management strategies. Integrated into the context of a long-term strategy, short-term structural channel manipulations can then be more biologically effective. All structural improvement projects should be designed so the placement is appropriate for the hydro-geomorphological characteristics of the reach.

Habitat projects aimed at securing critical habitats and rehabilitating impacted habitats should be accomplished concurrently with improved habitat protection measures. Hydraulic Code permitting standards, shoreline management regulations, floodplain ordinances, critical area ordinances, and comprehensive plans should be reviewed, amended and strictly enforced to insure adequate protection of existing habitat. Implementation of adequate habitat protection regulations will help to maintain and enhance those naturally occurring habitat functions currently existing in the watershed. Focus should be removed from treating the effects of habitat degradation (ie. reduced pool quality and quantity, habitat, cobble embeddedness, reduced levels of LWD, high instream temperatures, and accelerated bank instability) with short-lived, engineered treatments (ie. stabilizing banks, anchoring woody debris, planting vegetation and installing barbs) to diagnosis and treatment of the causes of habitat degradation.

Factors Affecting Natural Salmonid Production in the Watershed

Currently production of self-sustaining anadromous salmonids are limited by the reduced numbers of returning wild adults to the Methow watershed. The Methow River is a journey of 424 river miles from the mouth of the Columbia River and requires navigating through nine hydroelectric facilities once as smolts and again as adults. Coincident with unfavorable ocean conditions and harvest impacts, the out-of-basin impacts can significantly affect the ability of the Methow watershed to support self-sustaining anadromous salmonids. Regarding bull trout populations, little information exists concerning the impact of hydroelectric development in the Upper Columbia River system on fluvial bull trout forms but there is speculation that the conversion of the free-flowing upper Columbia River to a series of reservoir impoundments has had a negative effect on upper Columbia River fluvial bull trout populations (Brown1992). Maintaining self-sustaining populations of stream-resident and adfluvial forms of bull trout however, are dependent on providing properly functioning habitat and access to that habitat in sufficient quantities within the watershed.

Natural environmental conditions also can limit natural production of salmonids in the Methow watershed. Extreme winter conditions, the result of latitude, elevation and the influence of the Cascade mountain range on marine and arctic air masses, combine to create extreme winter conditions which contribute to reduced fish growth and activity (Mullan et al. 1992). In years when moisture availability is limited by climatic conditions, instream flows become severely reduced resulting in dewatered reaches, winter icing, and higher summertime water temperatures. Depending on the severity of the climatic conditions, the duration and extent of low instream flows and dewatered reaches can expand. These conditions restrict salmonid access to habitat, dewater redds, and strand juveniles, resulting in direct mortality to salmonids. Catastrophic disturbances are also a natural component of this ecosystem and limit salmonid production. Landslides, floods and fire create a disturbance regime that cleanses, builds and replenishes the aquatic environment. While these events reduce habitat availability or function in one stream reach, they improve habitat conditions in another stream reach by recruiting spawning gravels and LWD while flushing sediment.

In some portions of the watershed, human alterations to the environment are exacerbating naturally limiting conditions by reducing habitat quality and quantity thereby reducing a species' chances of successfully completing its life cycle. These alterations have primarily occurred in the lower gradient, lower reaches of subwatersheds and include road building and placement, conversion of riparian habitat to agriculture and residential development, water diversions, and diking. However, in Cub, Boulder, Eightmile and Falls creeks (all in the Chewuch River subwatershed), and in the Goat, Beaver, Libby and Gold creek drainages, impacts also extend into the upper reaches of the drainages. These impacts are mostly the result of past timber harvest operations, road building and placement, and grazing.

Providing that habitat rehabilitation and protection of aquatic systems continues on federally owned land within the watershed as per current standards and guidelines

(PACFISH; USDA Forest Service and USDI Bureau of Land Management 1995), it is the professional opinion of the TAG that habitat conditions in the upper portions of the Methow watershed are sufficiently intact to support self-sustaining populations of salmonids given the following: 1) no further reduction in habitat quality and quantity in the watershed; 2) removal of artificial fish passage barriers and installation of approved screening devices on water diversions; 3) rehabilitation of stream functions in the lower reaches of certain tributaries and portions of the mainstem; 4) instream flows sufficient so as not to impede adult fish passage and salmonid rearing; 5) and adequate out-of-basin survival rates are achieved to maintain basin populations.

The Technical Advisory Group's Recommendations Ranked in Order of Importance

1. **Protection of properly functioning habitat.** The TAG identified protection of properly functioning habitat as the most critical action necessary to insure sustainability of naturally-producing, anadromous salmonids in the Methow watershed, given adequate returns of adult spawners. Floodplains and riparian habitat along the upper Methow River from the Lost River confluence, inclusive, downstream to the town of Winthrop was identified by the TAG as habitat in the most immediate need of protection. Protecting functional floodplains and riparian habitat located in the lower 15 miles of the Twisp River and along the middle mainstem Methow River was identified as a high priority second to the upper Methow River habitat. Although enough professional knowledge exists to identify habitat that qualifies for immediate protection, given the lack of information on non-federal lands, a study is needed to define current floodplains, habitat conditions, and fish usage in the Methow watershed in terms of channel form and process. This would allow for the development of a coordinated, watershed-level approach to habitat protection that would address issues of maintaining habitat connectivity and habitat-forming processes.
2. **Restoration of fish passage and screening of water diversions.** Concurrent with habitat protection, restoring fish passage at critical fish passage barriers and meeting NMFS Juvenile Fish Screen Criteria for water diversions was identified by the TAG as a critical action needed to promote sustainability of naturally-producing, anadromous salmonids in the Methow watershed. To implement a watershed-wide strategy of fish passage restoration in a logical and sequential manner, a single data set of inventoried fish passage barriers with the quantity and quality of habitat upstream of the barriers is needed. In regards to fish screen needs, Greg Knott of the Okanogan National Forest, Methow Valley Ranger District (U.S. Forest Service, pers. comm., April 2000) has stated that all water diversions on USFS land have been identified and are screened as per federal standards. The Forest Service maintains the locations of all water diversions in a Geographic Information Services (GIS) coverage with an associated database. The WDFW Salmonid Screening, Habitat Enhancement and Restoration (SSHEAR) Division also maintains a database of water diversions and screen conditions for which they have an installation or maintenance agreement. For the purpose of this report, a map of known water diversions and fish screens in

the Methow watershed was created by combining these two data sets (Map Appendix D). There is still a need to review this data to reconcile any inconsistencies between the data sets. A field inventory of unidentified water diversions and stream conditions will then be needed to fill in gaps in knowledge.

3. **Restoration of stream functions in the lower 15 miles of the Twisp River.** Next to habitat protection, fish barrier removal and screening issues, rehabilitating the stream functions in the lower 15 miles of the Twisp River was identified by the TAG as a critical action needed to insure sustainability of naturally-producing, anadromous salmonids in the Methow watershed. Based on spring chinook spawning ground survey results from 1987 – 1999 (Appendix B, **Table B- 1**), 25% of spring chinook redds were found in the Twisp River. Prior to human alterations, the natural characteristics of the lower Twisp River landscape (its geomorphological characteristics) would have provided much in the way of associated beaver/wetland complexes, riparian forests with a cottonwood gallery component, and active side channels. These habitats are highly productive habitats for salmonids, benefiting not only spring chinook salmon but rainbow/steelhead and bull trout populations as well. Lower Gold Creek and lower Lost River are other reaches in the Methow watershed where rehabilitation would benefit chinook, rainbow/steelhead and bull trout species although to a much lesser extent. Rehabilitation of stream functions in the lower reaches of Wolf Creek, the Chewuch River and Early Winters Creek also would benefit salmon, rainbow/steelhead and bull trout. There are active restoration plans in place for both the Chewuch and Early Winters, and a Habitat Conservation Plan is currently being negotiated for the Wolf Creek drainage. Projects proposed for these areas should take into consideration on-going efforts and strategies.
4. **Research, analyze and assess the relationship between stream flows and water use in the watershed.** Dewatering in portions of the upper Methow River between Robinson Creek (RM 74.6) and the Weeman Bridge (RM 59.7) have been documented as far back as 1898 (Gorman 1899) and are considered a naturally occurring condition. In the lower reaches of some tributaries to the Methow River, dewatering and/or low flows have been documented below water diversions or where considerable human alterations have occurred in the drainage (Wolf Creek, Goat Creek, Beaver Creek, Libby Creek, Gold Creek, and Black Canyon Creek). The extent to which environmental conditions or human influences contributes or causes low flows or dewatering in a given reach requires further data collection and analysis. Data needs that would improve the understanding of the hydrologic functions and conditions in the Methow basin include: 1) a groundwater and surface water interactions study that analyses the patterns and speed of movement of groundwater (especially relative to irrigation return flows; BPA 1997, page 35), identifies critical groundwater recharge areas, and identifies where groundwater contributes to surfacewater ; and 2) a study of the correlation between properly functioning habitat and fish species use as affected by the various hydrologic processes and functions. In 1999, Okanogan County received start-up funding from a Centennial Clean Water Grant to initiate a hydrologic study in the Methow basin. In May 2000, the budget

signed by Washington Governor Gary Locke provided \$500,000 to Okanogan County to fund a comprehensive hydrologic study in the Methow watershed. These funds will be available to the County beginning July 2000.

5. **Development and implementation of water conservation practices.** Given the natural variation in stream flows in the Methow watershed, the TAG identified developing and implementing water conservation practices for all uses watershed-wide as a critical action necessary to insure sustainability of naturally-producing, anadromous salmonids in the Methow watershed. Decreased stream flows from July until May are a natural condition in the watershed, a function of environmental influences, and therefore highly variable within a year and between years. Instream flows can be negatively influenced by human-induced changes in the watershed, potentially altering the timing and magnitude of peak and base flows. The lowest flows in the Methow watershed usually occur naturally during the winter months (January – April) when snowpacks do not thaw, precipitation falls only as snow, and some stream reaches freeze up entirely (winter icing). The Chewuch and Twisp River subwatersheds are examples of areas in the watershed where winter icing conditions can negatively affect salmonid productivity. Low flows and lack of riparian vegetation can contribute to this condition. During periods of low snowpack and drought, low flow conditions can also extend into the summer and fall months. Natural low flow conditions can be exacerbated by the diversion of instream flows for irrigation and domestic use during July, August, and especially September. A decrease in the water storage capacity of the drainage and a change in runoff patterns can also affect instream flows in the Methow watershed.

Summary of Habitat Conditions by Subwatershed

Presented below is a summary of habitat conditions by subwatershed that have been identified by the TAG in the development of the report. A more detailed discussion of habitat conditions in each subwatershed can be found in the “Habitat Limiting Factors by Subwatershed” chapter of this document.

Upper Methow River Subwatershed (156,160 acres). The most significant human-induced impacts in this subwatershed occur along the mainstem Methow River from the Lost River confluence downstream to the town of Winthrop. The portions of the subwatershed above the valley floor are in a properly functioning condition with the exception of the lower two-thirds of the Goat Creek drainage. The alluvial fans of every major tributary to the Methow River in this reach have been diked and channelized to some extent (Lost River, Early Winters Creek, Goat Creek, Wolf Creek). Large woody debris levels are inadequate throughout this section of the river although from the headwaters downstream to Goat Creek (RM 64.0) large woody debris levels have been improving and are reaching an “adequate” amount. Accelerated bank destabilization is occurring where riparian lands have been converted to residential and agricultural use. Dewatering of portions of the mainstem Methow River from Robinson Creek downstream to the Weeman bridge naturally occur during low water years. The extent to which the loss of fish production from dewatering in this subwatershed is offset by

successful production in other areas of the Methow watershed may be dependent on maintaining accessibility to quality spawning and rearing habitat in the rest of the watershed.

Lost River Subwatershed (107,538 acres). Human impacts in this subwatershed are restricted to the alluvial fan in the lower mile of the Lost River. Nearly 95% of the subwatershed lies within the Pasayten Wilderness. Within the channel migration zone of the first river mile, construction of roads, dikes and buildings associated with home developments have confined the channel, reducing pool quality and quantity and eliminating side channel habitat. Some riparian habitat in the lower mile has been converted to residential development and pasture land. Large woody debris has been removed from the lower mile of the river for flood control and firewood gathering, although recruitment potential is good from the upper reaches of the watershed.

Early Winters Subwatershed (51,547 acres). Although Highway 20 runs parallel to Early Winters Creek up to the headwaters, human impacts in this subwatershed are primarily restricted to the lower 2 miles of Early Winters Creek, including its alluvial fan. Habitat conditions elsewhere in the subwatershed are in a relatively undisturbed or properly functioning condition. The lower ½ mile has been riprapped and diked to keep the channel in a stable location to accommodate Highway 20, the Early Winters Campground development, and to protect private property. Confinement of the floodplain in this reach concentrates high flows resulting in channel incision and entrenchment. High water velocities then scour the channel, destabilizing banks and flushing out spawning gravels. Levels of LWD in the first two miles are low and pool quality and quantity is poor. Severe low flows persist in the lower 1.4 miles of the creek where there are also two water diversions.

Chewuch River Subwatershed (335,000 acres). Downstream of RM 25.0, human land-use impacts within the tributaries and along the mainstem of the lower 25 miles of the Chewuch River limit salmonid productivity in this subwatershed. The upper 50% of the subwatershed is in a properly functioning condition. Chronic and catastrophic sediment delivery to streams (correlated to highly erodible soils exacerbated by impacts from high road densities, road placements, and grazing) and reduced levels of LWD (a result of stream cleanouts and a loss of mature riparian LWD recruitment material) are driving habitat degradation in the lower half of the Chewuch subwatershed. This condition is compounded by; 1) channelization in the alluvial fans at Farewell, Lake, Twentymile, and Boulder creeks, 2) removal of large trees in the riparian zone along the lower 25 miles of the Chewuch River and lower Lake Creek, 3) a decrease in beaver activity over historic times, and 4) low flows in the lower 8 miles of the Chewuch River. There are also three water diversions in lower Chewuch River (RM 9.0, RM 8.1 and RM 0.9) and two water diversions in Eightmile Creek (both at RM 0.25) which enters the Chewuch River at RM 8.0.

Middle Methow River Subwatershed (162,834 acres). Diking, the conversion of riparian areas to agriculture and residential uses, and large woody debris removal along the mainstem Methow River are the most significant human impacts in this

subwatershed. As a result, there has been a loss of side channel access and habitat complexity. Additionally, numerous man-made fish passage barriers and unscreened water diversions have been identified in the Beaver Creek drainage, which is included in this subwatershed. A fish passage barrier and screen inventory conducted in 1998 by WDFW (Gower and Espie 1999) identified 78 man-made fish passage barriers (includes both partial and full barriers) and 26 unscreened water diversions (includes both pump and gravity diversions).

Twisp River Subwatershed (157,114 acres). The capability of the lower 15 miles of the Twisp River to provide productive salmonid habitat has been substantially reduced (TAG 2000). This is the result of reduced LWD levels, road placement, dike placement, bank hardening, and conversion of riparian areas to agriculture and residential uses. In addition, from RM 4.0 to the mouth, the reduction of instream flows resulting from water diversions further reduces the quantity of rearing habitat and access to rearing habitat.

Lower Methow River Subwatershed (235,553 acres). There has been no survey or data collection on habitat conditions for the segment of the Methow River that falls within this subwatershed (RM 0.0 - 27.0). Very little of this reach has been visited by TAG participants. Because of the lack of knowledge on habitat conditions, the TAG did not feel qualified to assess the condition of habitat factors for this reach of the Methow River. The Libby Creek and Gold Creek drainages are included in the subwatershed and have more information available for assessment needs. Both drainages have been heavily managed for timber harvesting and livestock grazing and are heavily used areas for recreation in the Methow Valley Ranger District. Roads placement and high road densities are having a major affect on aquatic habitat in both drainages where roads parallel every major stream. Throughout most of both drainages, LWD levels, pool habitat, and sediment delivery are poor to fair. In addition, the lower 2.9 miles of Libby Creek have been channelized and portions of the banks along the lower 3.5 miles of Gold Creek have been ripped. In years when water diversions exceed base flows during August and September, lower Libby Creek dewater. Portions of the lower 3 miles of Gold Creek also dewater during dry years.

Inventory and Assessment Data Gaps for the Watershed

Following are the overriding watershed-level inventory and assessment data gaps for the Methow watershed. Obtaining this information will increase the ability of the public and technical staff to make natural resource management decisions at the watershed-level with a higher degree of confidence in the outcomes or results. These data gaps and subwatershed-level data gaps are discussed in more detail in the “Habitat Limiting Factors by Subwatershed” section of this document.

- An assessment of the extent salmonid productivity is being limited by habitat conditions (human-induced or natural), correlated to species and life stage, and provided on a stream reach basis. This would allow for the development of a long-term coordinated, watershed-level strategy to protect and restore salmonid habitat.

This can be accomplished using existing data and professional knowledge and can be fine-tuned as more data collection and analysis is completed.

- A watershed-wide fish passage barrier and screen safety inventory and assessment to include both private and public lands. This should incorporate existing state, federal and local data and GIS into a single, accessible database and GIS coverage.
- A study is needed to define current floodplains in the Methow watershed in terms of channel form and process. This would contribute to the development of a habitat protection and restoration strategy that would address issues of maintaining habitat connectivity and habitat-forming processes.
- A watershed wide inventory and assessment of riparian habitat and conditions including change over time. This should be developed at a 1:24,000 map scale. It should incorporate existing federal and non-profit data, along with data acquired from an inventory of non-federal lands, into a single, accessible GIS coverage.
- A hydrologic assessment to evaluate groundwater and surface water interactions, identify critical ground water recharge areas, and locations where groundwater contributes to surfacewater. A measure of the affect this interaction has on moderating high summertime and low wintertime surface water conditions should be included.